Space Weather Forecast

Issued on Sunday, 22 October 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Weak Coronal Mass Ejection arrivals possible on Day 1 (22 Oct) with a slight chance of G1/Minor Storm intervals.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity is Low with isolated Common-class flares. Six sunspot regions currently feature on the visible solar disc, all of which are relatively small and simple. One region in the northwest and one in the northeast are both showing signs of minor development.
No Earth directed Coronal Mass Ejections (CMEs) have been observed during the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was subjected to minor enhancement leading into the current 24-hour period, likely a result of a glancing CME influence. The solar wind has remained at slow-ambient levels throughout and is currently around 300 km/s. The Interplanetary Magnetic Field was generally at moderate levels until around 21/1300 UTC, after which it has been weak. The important north-south component was moderately southward directed until around 21/1300 UTC, and has since weakly fluctuated but remained southward directed.

Geomagnetic activity was initially Active (Kp 4) with two intervals at G1/Minor Geomagnetic Storm (Kp 5) level. Activity has been Quiet to Unsettled (Kp 1-3) since 21/0900 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, with energetic particles at background levels throughout.

Four-Day Space Weather Forecast Summary
Solar Activity: Low solar activity is likely to continue. There is a slight chance of Moderate-class flares, with the probabilities increasing slightly through the period given the potential for new or returning regions, and for regions on the disc to develop.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is complex and carries high uncertainty. There remain two probable Earth-directed CMEs in the forecast which may produce glancing impacts on Day 1 (22 Oct). However, both of which are expected to largely miss. There is potential for some minor enhancement to solar winds originating from coronal hole fast wind enhancement from late Day 2 (22 Oct) or early Day 3 (24 Oct). Low confidence in details.
Geomagnetic activity is expected to be predominantly Quiet to Unsettled (Kp 0-3) with a chance of Active (Kp 4) intervals and a slight chance of a G1/Minor Geomagnetic Storm (Kp 5) on Day 1 should the forecast Coronal Mass Ejection (CME) arrivals take place. By Day 3 Unsettled to Active (Kp 3-4) intervals are then possible with the arrival of the anticipated minor coronal hole fast wind.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	5	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	5	5	10	10
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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